CLAIMS

What is claimed is:

1. A communications network comprising:

a passive optical network (PON);

plural user terminals coupled to the PON, each user terminal having an optical transmitter for transmitting an upstream signal in an optical channel dedicated to the user terminal and an optical receiver for receiving a shared downstream signal in a shared optical channel;

a central terminal coupled to the PON and having an optical transmitter for transmitting the shared downstream signal and plural optical receivers each receiving one of the dedicated upstream signals.

2. The communications network of Claim 1 wherein the central terminal includes a WDM filter array for separating the dedicated upstream channels for reception at the plural central terminal optical receivers.

3. The communications network of Claim 1 wherein the WDM filter array comprises a thin-film filter device.

4. The communications network of Claim 1 wherein the user terminals each include a WDM filter for isolating the shared downstream channel for reception at the user terminal optical receiver.

5. The communications network of Claim 1 wherein there are N user terminals (N>1) and wherein the central terminal optical transmitter transmits the shared downstream signal in a shared optical channel at wavelength λ_o and the user terminal optical transmitters transmit the upstream signals in dedicated optical channels at dedicated wavelengths λ_1 to λ_N, respectively.

6. The communications network of Claim 5 wherein wavelength λ_o is at the 1310 nm band and the wavelengths λ_1 to λ_N are between 1500 and 1600 nm.

7. The communications network of Claim 1 wherein the central terminal optical transmitter transmits the shared downstream signal in a shared optical channel at wavelength λ_o and wherein the plural user terminals include a first group of user terminals each having an optical transmitter that includes a coarse WDM laser and a second group of user terminals each having an optical transmitter that includes a dense WDM laser.

8. The communications network of Claim 7 wherein the first group comprises up to four user terminals having coarse WDM lasers that operate respectively at dedicated wavelengths of 1511, 1531, 1571 and 1591 nm.

9. The communications network of Claim 7 wherein the second group comprises up to eight user terminals having dense WDM lasers that operate at dedicated ITU channels.

10. The communications network of Claim 9 wherein the ITU channels include ITU channels #27, #29, #31, #33, #35, #37, #39 and #41.

11. The communications network of Claim 7 wherein wavelength λ_o is at the 1310 nm band.

12. The communications network of Claim 5 wherein wavelength λ_o and the wavelengths λ_1 to λ_N are selected from channels between 1500 and 1600 nm.

13. The communications network of Claim 12 wherein wavelength λ_o and the wavelengths λ_1 to λ_N are selected from channels in the 1540 to 1565 nm band.

14. The communications network of Claim 13 wherein wavelength λ_o is at ITU channel #30 and for N less than 16, the wavelengths λ_1 to λ_N are selected from ITU channels #31 to #44, respectively.

15. The communications network of Claim 1 wherein the central terminal includes an SDH/SONET multiplexer, the user terminals each include an SDH/SONET add-drop multiplexer and the shared downstream signal is a static time division multiplex signal.

16. The communications network of Claim 1 wherein the central terminal includes an ATM switch and framer, the user terminals each include an ATM framer and the shared downstream signal is a dynamic ATM time division multiplex signal.

17. The communications network of Claim 1 wherein the central terminal and the user terminals each include an Ethernet switch and the shared downstream signal is an Ethernet time division multiplex signal.

18. In a communications network, a method of communications comprising:

coupling plural user terminals and a central terminal to a passive optical network (PON);

at each user terminal, transmitting an upstream signal in an optical channel dedicated to the user terminal and receiving a shared downstream signal in a shared optical channel;

at the central terminal, transmitting the shared downstream signal and receiving one of the dedicated upstream signals at a plurality of optical receivers.

19. The method of Claim 18 wherein there are N user terminals (N>1) and wherein the central terminal transmits the shared downstream signal in a shared optical channel at wavelength λ_o and the user terminals transmit the upstream signals in dedicated optical channels at dedicated wavelengths λ_1 to λ_N, respectively.

20. The method of Claim 19 wherein wavelength λ_o is at the 1310 nm band and the wavelengths λ_1 to λ_N are between 1500 and 1600 nm.

21. The method of Claim 19 wherein wavelength λ_o and the wavelengths λ_1 to λ_N are between 1500 and 1600 nm.